Work wearing protective clothing in hot environments: Lessons learned from the development of firefighter personal protective clothing standard test

Ilham BAKRI[1,2], Yutaka TOCHIHARA[2]
1) Industrial Engineering Department, Hasanuddin University
2) Human Science Department, Kyushu University

ABSTRACT

Firefighters are one of the stakeholders that extensively use protective clothing in their service which is mostly done in hot environment. In series of studies to create a compromise between the need for safety and the need for comfortable use of personal protective clothing (PPE), testing to confirm specifications that have to be achieved in every modification or new proposed product of PPE is vital. Confirmation of not only physical/technical aspect specifications of PPE, but also the physiological aspect specification as a result of wearing PPE is needed. To date, European Standard (EN) 469 (2005) has provided comprehensive test methods to assess garment performance designed to protect firefighters. The British Standard (BS) 8469 (2007) also has covered almost all issues regarding test methods to assess the ergonomic performance and compatibility of PPE using humans as subjects. However, some inconsistencies between these standards still remain. For that reason, and to response the need for an easier and reliable PPE standard, a new firefighter PPE standard test was developed. In an attempt to establish this new standard, we found some valuable lessons in related to the men working using PPE in hot environment. Firstly, there is still more space to reduce the burden on firefighters by improving the SCBA and its harness design. Secondly, a PPE should be tested in hot environment to have a better understanding about the physiological impact of the PPE in a similar condition that it will be used. And lastly, although the tympanic temperature was more reactive, the tympanic temperature profiles were in a similar tendency to the rectal temperature profile so that the tympanic temperature measurement is acceptable in a PPE standard test.